Instructional Framework

Cabinetmaking
46.0400.40

Domain 1: Project Construction Instructional Time: 45-55%	
STANDARD 3.0 Demonstrate basic cabinetmaking skills	
3.1 Apply math skills to solve problems related to cabinetmaking, including written instructions to complete a task	● add, subtract, multiply, divide fractions ● measure accurately
3.2 Calculate linear feet, square feet, and board feet	● straight line, area, volume ● unit conversion (inches to feet) ● board feet (length x width x thickness)
3.3 Tally lumber products	● cabinet parts estimations (hardware, backs, toe kicks, styles, rails, etc.)
3.4 Measure accurately and convert to standard and/or metric measurement systems as required	● tape measure, ruler measurements ● metric to standard conversions ● standard to metric conversions
3.5 Lay out straight and angled cuts	● combination square ● adjustable T-bevel ● protractor ● try square
3.6 Determine plumb, level, and square	● plumb bob ● level ● framing square, try square, combination square, ruler ● tape measure
3.7 Handle and store wood products	● sheet goods ● wet lumber or freshly cut ● climate control
3.8 Specify wood stock for species, grade, grain patterns, and color compatibility	● oak, pine, maple, birch, alder, walnut, ash ● hardware grades

	• sheet good grades
STANDARD 7.0 Interpret plans and blueprints to create a product	
7.1 Read and interpret blueprints	• house floor plans • business floor plans • cabinet placement
7.2 Extract information from plans for design and specifications	• measurements
7.3 Verify design plans with field measurements	• field measurement • drywall compensation • electrical placement • plumbing placement
7.4 Create a cut list	• parts and sizes for cabinets • face frames, doors, drawer components
7.5 Create a bill of materials	• cut list • lumber prices • profit percentage
STANDARD 8.0 Cut and shape products	
8.1 Mill rough lumber to create S4S (surfaced on four sides) stock	• planer, jointer, table saw • process of creating S4S
8.2 Cut sheet goods to size and shape	• panel saw • table saw • saw blade types
8.3 Create basic woodturnings	• wood lathe • tools (calipers, gouge, skew, parting tool, etc)
8.4 Create basic mouldings	• routers, shaper • bit types
STANDARD 9.0 Demonstrate common joinery applications	

9.1 Layout and cut butt joints	• square, accurate cuts
9.2 Reinforce butt joints using dowels, screws, biscuits, and pocket screws	• dowels, screws, biscuits, pocket screws
9.3 Layout and cut a dado joint	• thickness of material • depth of cut • table saw, router • location of joint • common uses
9.4 Layout and cut a rabbet joint	• location of joint • table saw, router • thickness of material • depth of cut • common uses
9.5 Layout and cut a lap joint	• table saw, router • thickness of material • depth of cut • common uses
9.6 Layout and cut a miter joint	• angles calculation • miter saw • common uses
9.7 Layout and cut a tongue and groove joint	• shaper, router, table saw • thickness of material • depth of cut • location of joint • common uses
9.8 Layout and cut a mortise and tenon joint	• depth of cut • thickness of material • location of joint • common uses • hollow chisel mortiser, drill press • blind and through
9.9 Layout and cut a dovetail joint	• thickness of material • common uses

	• dovetail jig, router • half blind and through • pins and tails
9.10 Layout and cut a box joint	• thickness of material • common use • depth of cut • table saw, dovetail jig, router
STANDARD 10.0 Assemble products using fasteners, adhesives, and hardware	
10.1 Explain the purpose and applications of common fasteners	• screws and nails • length of fasteners • round, oval, flat screws • common, finish, brad nails
10.2 Explore various fasteners and RTA (Ready to Assemble) connectors	• camlock, cam and bolt
10.3 Explain the purpose, types, and applications of common adhesives	• contact cement, wood glue, construction adhesive, silicone, polyurethane
10.4 Use adhesives appropriate to the application	• plastic laminate, veneer, solid surface material, lumber products
10.5 Use various clamping devices	• bar clamps, wood screw clamps, quick clamps, c clamps, band clamps, pipe clamps
10.6 Demonstrate various ways to remove excess glue	• putty knife, scraper, dry cloth
10.7 Assemble drawer components	• slides, pulls, knobs
10.8 Explore cabinet installation using fasteners and levelers	• types of screws, shims
10.9 Fasten stock with metal fasteners (e.g. nails, screws, and staples)	• nails, screws, staples • pneumatic nail gun, hammer, nail sets, drills, impact guns
10.10 Construct case/box	• dado joints

	• clamps • measuring tools • glue • fasteners
10.11 Assemble panel doors	• rail styles • dry fit • measuring tools • clamps
10.12 Attach moulding and trim	• finish nailer • adhesive • wood filler/putty
10.13 Explore common uses and applications of jigs and fixtures	• self-centering jigs • line drilling jigs • drawer slide jig
10.14 Fasten a top to the casework	• adhesive, clear silicone • screws
10.15 Install cabinet hardware	• screws • hinges, knobs, pulls • pilot holes • drills • drawer slides • door bumpers
10.16 Reinforce joints with block	• glue blocks
STANDARD 12.0 Demonstrate finishing materials and processes	
12.1 Explain the purpose and applications of various types of finishes and finishing processes	• color application • seals pores to protect wood • brush, spray, dip, hand rubbed
12.2 Select finishing materials for compatibility	• oil-based, water or latex based, lacquer
12.3 Follow a finish schedule	• surface preparation • fill • pretreat sealer

	• sanding sealer • stain • top coat application
12.4 Apply filler to a wood surface	• paste filler • sandable filler
12.5 Apply a seal coat to a wood surface	• sanding sealer • uniform color finish • wood conditioner • shellac
12.6 Select and use appropriate abrasive types and grit sizes	• sandpaper • grit size 220-600 • steel wool • steel wool grade #4--#0000
12.7 Stain a wood surface	• water based, oil based • pigmented, dye • gel coat
12.8 Apply clear coat finishes to wood surfaces	• roll, brush, spray, dip
12.9 Apply pigmented finishes to wood surfaces	• water based, oil based • pigmented • gel coat
12.10 Use cleanup methods according to safe and approved methods (OSHA, EPA, DNR)	• water based/latex - water clean up • oil based - mineral spirits/paint thinner • lacquer - lacquer thinner • proper disposal of liquids • proper disposal of rags/brushes
12.11 Repair blemishes/touch up finishes	• wax sticks • steam dents

Domain 2: Machine and Tool Safety **Instructional Time: 45-55%**	
STANDARD 2.0 Demonstrate general shop safety	
2.1 Explain the importance of shop safety	● health risks ● personal injuries
2.2 Maintain appropriate appearance and safe work attire	● closed toed shoes ● no long sleeves ● no baggy clothing ● long hair tied back ● jewelry removed
2.3 Wear appropriate PPE equipment (personal protective equipment) when needed (e.g. eye protection, ear protection, impact hat)	● safety glasses/goggles ● face shield ● hearing protection (ear muffs, foam plugs) ● hard hat ● respirator ● dust masks
2.4 Use equipment safety features according to manufacturer's recommendations	● machine guarding ● automated feeders
2.5 Use proper lifting techniques	● lift with legs, not back
2.6 Examine health-related problems related to exposure to hazardous materials	● chemical burns ● diseases from exposure
2.7 Examine the benefits of using dust collection	● respiratory health ● explosion danger
2.8 Comply with government regulations regarding health and safety in the shop [e.g. OSHA (Occupation Safety and Health Administration), EPA (Environmental Protection Agency), and DNR (Department of Natural Resources)]	● OSHA standards on safety equipment (machine guarding) ● ANSI requirements to meet OSHA standards for PPE
2.9 Comply with lockout/tagout rules and procedures	● lockout/tagout station ● lockout/tagout procedures

2.10 Handle, use, and store chemicals according to MSDS/SDS sheets	● protective gloves ● eye protection ● flammable storage cabinet ● flammable storage procedures
2.11 Apply fire safety rules and procedures	● fire evacuation routes ● used flammable goods disposal procedures ● types of fire extinguishers ● PASS method
STANDARD 4.0 Practice safe and appropriate use of hand and portable power tools	
4.1 Use steel rules/tapes, squares, T-bevels, and calipers	● steel rules/tapes ● squares ● T-Bevels ● calipers
4.2 Use planes and cabinet scrapers to smooth surfaces	● planes ● cabinet scrapers
4.3 Use wood chisels to notch or mortise stock	● wood chisels ● mortise stock
4.4 Drive and set nails and screws	● nail sets ● hammers ● screws, nails
4.5 Fasten materials using a pneumatic stapler or nailer	● various staples, nails
4.6 Use a circular saw to make straight, beveled, and compound angle cuts	● combination square ● circular saw
4.7 Use a saber/jig saw to plunge/cut curves	● saber/jig saw ● blades
4.8 Drill holes with a portable power drill	● portable power drill ● bits
4.9 Use a power drill to bore holes to specified depth	● depth stops ● bits ● tape

4.10 Create pocket screw joints using a drill and jig	• drill • KREG jig
4.11 Use a router to shape edges; cut a groove, dado, and rabbet	• router • various bits
4.12 Use a router with a dovetail jig	• router • dovetail jig and bits
4.13 Use plate/biscuit joiners for square and angled joints	• plate/biscuit joiners • biscuits (#0, #10, #20)
4.14 Use sanders for roughing and finishing	• orbital sander • random orbital sander • various sandpaper grits
4.15 Use a belt sander and grinder to scribe cut a product	• belt sander • grinder sander • scribe
4.16 Clean and maintain hand and portable power tools	• dry rag, brushes, compressed air • lubrication • inspect for damage
STANDARD 5.0 Practice safe and appropriate use of stationary machines	
5.1 Use a table saw to make rip, cross, miter, bevel, and groove cuts	• table saw • miter gauge • dado blade • rip fence • rip, cross cut, and combination blades
5.2 Select, change, and set up blades on a table saw	• dado, rip, cross cut, and combination blades • wrenches • direction of lock nut (loosen, tighten)
5.3 Use a radial arm saw to make cross, miter, and compound angle cuts	• radial arm saw
5.4 Select, change blades, and adjust for squaring on a radial arm saw	• dado, rip, cross cut, and combination blades • wrenches • direction of lock nut (loosen, tighten)

	• framing square
5.5 Use a miter/sliding miter saw to make cross, bevel, miter, and compound miter cuts	• miter/sliding miter saw
5.6 Select and change blades on a miter saw	• dado, rip, cross cut, and combination blades • wrenches • direction of lock nut (loosen, tighten)
5.7 Use a band saw to cut irregular shapes and re-saw materials	• band saw • fence
5.8 Select, change, or replace band saw blades	• size of blade dictates circle size • proper blade tension
5.9 Set up and use a drill press	• drill press • drill bit index • clamping device • chuck key
5.10 Use a jointer to square, bevel, and flatten stock	• jointer • precision square • push blocks
5.11 Use a router in a router table	• router • push blocks • push sticks • router bits • feather boards
5.12 Use a surface planer to smooth surfaces	• surface planer
5.13 Utilize a hollow chisel mortiser	• layout
5.14 Set up and use a line boring machine	• set up • adjust spacing • adjust number of holes
5.15 Set up and use a lathe for woodturning	• wood lathe • calipers • face plate

	• tool rests • various lathe tools
STANDARD 6.0 Examine computer numerical control equipment (CNC)	
6.1 Explore various CAM (Computer Aided Manufacturing) software for programming CNC (Computer Numerical Control) manufacturing equipment	• CAM software • CNC machine • CNC simulator
6.2 Explore various CNC equipment and equipment operations, including 3-dimensional technology	• CNC routers • CNC lathe • rotary indexer • X, Y, Z axis
6.3 Demonstrate CNC equipment operation (actual or simulated)	• live presentation • video presentation
6.4 Program CNC machines to produce a part	• CAM software • various bits • computer

Domain 3: Veneers and Laminates **Instructional Time: 5-10%**	
STANDARD 11.0 Apply wood veneers and laminates	
11.1 Cut veneers and laminates with appropriate saw blades and router bits	• veneers, plastic laminate • trim routers • carbide router bits • straight edge • clamps
11.2 Seam two pieces of veneers and/or laminates	• veneers, plastic laminate • trim routers • carbide router bits • straight edge • clamps
11.3 Apply adhesive	• trays

	• brushes • rollers • sprayer • contact cement • spray adhesive
11.4 Apply edge banding	• edge bander • J roller • hot iron • self-stick edge banding • edge banding • laminate edge trimmer
11.5 Apply veneers and/or laminates to core	• contact cement • brushes, rollers, spray adhesive • J roller • dowel rods
11.6 Apply wood edges	• wood glue • pneumatic nail guns
11.7 Cut veneers and/or laminates to size	• trim routers • carbide router bits
11.8 Fit veneers and/or laminate joints	• dry fit • tight, flat, invisible
11.9 Trim edges	• trim routers • carbide router bits • laminate edge trimmer

Domain 4: Business Practices **Instructional Time: 5-10%**	
STANDARD 1.0 Demonstrate business operations in a shop	
1.1 Estimate the cost of a job (supplies, materials, labor, overhead)	• material list • lumber prices

	● profit percentage ● labor cost ● overhead cost
1.2 Develop a materials order from a cut list and plan	● cut list ● plan
1.3 Develop a materials order from a cut list and plan	● quality control of product ● lumber grades
1.4 Use customer service skills to be successful	● proper dress and appearance ● proper phone etiquette (name, business name, how can you help) ● Complete deadlines in timely fashion, no late work/setbacks